

REMARKS

Applicants respectfully request reconsideration of the above-identified application in view of the foregoing amendments and the following remarks.

In the February 5, 2003 Office Action, the Examiner noted that claims 1-20 were pending in the application, that claims 10 and 18 were withdrawn from consideration and that claims 1-9, 11-17, 19 and 20 were rejected. By this Amendment, claims 1, 4, 9, 19 and 20 are amended, claims 10 and 16-18 are cancelled, and new claims 21-37 are added. No new matter has been added by this Amendment. Support for these amendments and support for the limitations of the new claims can be found at paragraph [0008] of Applicants' specification and in Applicants' originally presented claims. Applicants believe that claims 1-9, 11-15 and 19-37 are in condition for allowance. The Examiner's rejections are respectfully traversed below.

Election

In the Office Action, the Examiner noted that during a telephone conversation on January 31, 2003 with attorney of record Steven Meyer, a provisional election was made with oral traverse to prosecute the invention of Group I, namely claims 1-9, 11-17, 19 and 20. At the Examiner's request, Applicants now hereby affirm this election in writing.

Rejection Under 35 U.S.C. §112, ¶2

In the Office Action, the Examiner rejected claim 4 under 35 U.S.C. §112, paragraph 2, as being indefinite for failing to point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Examiner stated the term "relatively high-pressure and low temperature" rendered the claim indefinite.

While Applicants are of the opinion that claim 4 is in fact definite, Applicants have

amended claim 4 to further emphasize the claimed invention. Accordingly, Applicants respectfully submit that claim 4, as amended, satisfies the requirements of 35 U.S.C. §112, second paragraph. Withdrawal of this rejection is respectfully requested.

Rejection Under 35 U.S.C. §102(b) – Fetcenko et al.

In the Office Action, the Examiner rejected claims 1-5, 11 and 20 under 35 U.S.C. §102(b) as being anticipated by Fetcenko et al. (U.S. Patent No. 4,893,756).

Fetcenko et al. discloses a process which includes introducing ingots of hydrogen storage alloy material into a vessel and comminuting this material into particles by introducing hydrogen gas into the vessel. *Col. 9, ln. 54 – Col. 10, ln. 38*. Before the introduction of hydrogen gas, the vessel is evacuated and may be re-purged with argon and again evacuated. *Col. 8, lns. 38-42*. The particles are then transferred to a storage drum. *Col. 11, lns. 53-59*. The inner space of this storage drum is exposed to the environment before it is set below the vessel and transfer occurs. *See Col. 11, lns. 53-65*. Fetcenko et al. discloses that during the transfer of the particles, an argon gas purge is maintained to minimize introduction of air into the particles. *Col. 12, lns. 7-11*. However, Fetcenko et al. does not disclose that the drum is evacuated or filled with a substantially inert gas prior to transfer.

In the present invention, the already-activated hydrogen-absorbing alloy is transferred from an activation vessel to a hydrogen storage tank which has been evacuated or which has been filled with a substantially inert gas. *Paragraph [0008] of the specification and claims 1 and 20-22*. Fetcenko et al. does not disclose the step of evacuating a hydrogen-storage tank or the step of filling the hydrogen-storage tank with an inert gas as a precursor to the introduction of an activated hydrogen-absorbing alloy, as required by the present invention.

Accordingly, because Fetcenko et al. fails to disclose each and every limitation of

independent claims 1 and 20 (and dependent claims 2-5 and 11), withdrawal of this rejection is respectfully requested. Further, because Fetcenko et al. fails to disclose each and every limitation of newly presented independent claims 21 and 22 (and newly presented dependent claims 23-26 and 31), these claims are also allowable over Fetcenko et al.

Rejection Under 35 U.S.C. §103(a) – Fetcenko et al.

In the Office Action, the Examiner rejected claims 8, 9 and 12 under 35 U.S.C. §103(a) as being unpatentable over Fetcenko et al.

Claims 8, 9 and 12 depend, either directly or indirectly, from claim 1 and thus require that the hydrogen-absorbing alloy be transferred to an evacuated hydrogen storage tank after activation of the hydrogen-absorbing alloy. As discussed above, Fetcenko et al. does not teach or disclose the step of evacuating a hydrogen-storage tank as a precursor to the introduction of an activated hydrogen-absorbing alloy. Thus, Fetcenko et al. does not render obvious the claimed invention.

Furthermore, Applicants' newly presented claims 29, 30 and 32 depend, either directly or indirectly, from newly presented claim 22 and thus require that the hydrogen-absorbing alloy be transferred to a hydrogen storage tank filled with an inert gas after activation of the hydrogen-absorbing alloy. As discussed above, Fetcenko et al. does not teach or disclose the step of filling the hydrogen-storage tank with an inert gas as a precursor to the introduction of an activated hydrogen-absorbing alloy. Thus, Fetcenko et al. does not render obvious the claimed invention.

Accordingly, withdrawal of the Examiner's rejection is respectfully requested. Likewise, Applicants' newly presented claims 29, 30 and 32 are allowable over Fetcenko et al.

Rejection Under 35 U.S.C. §103(a) – Fetcenko et al. alone or in view of Leland

In the Office Action, the Examiner rejected claims 6, 7, 14-17 and 19 under 35 U.S.C. §103(a) as being unpatentable over Fetcenko et al. alone or in view of Leland (U.S. Patent No. 4,925,486).

Claims 6, 7, 14-15 and 19 depend, either directly or indirectly, from claim 1 and thus require that the hydrogen-absorbing alloy be transferred to an evacuated hydrogen storage tank after activation of the hydrogen-absorbing alloy. As discussed above, Fetcenko et al. does not teach or disclose the step of evacuating a hydrogen-storage tank as a precursor to the introduction of an activated hydrogen-absorbing alloy. Thus, Fetcenko et al. does not render obvious the claimed invention.

Furthermore, Applicants' newly presented claims 27, 28, 34 and 35 depend, either directly or indirectly, from newly presented claim 22 and thus require that the hydrogen-absorbing alloy be transferred to a hydrogen storage tank filled with an inert gas after activation of the hydrogen-absorbing alloy. As discussed above, Fetcenko et al. does not teach or disclose the step of filling the hydrogen-storage tank with an inert gas as a precursor to the introduction of an activated hydrogen-absorbing alloy. Thus, Fetcenko et al. does not render obvious the claimed invention.

Leland discloses a process for producing crushed zirconium sponge having particle configurations which enhance its compactability. *Col. 2, lns. 15-41*. However, Leland does not make up for the deficiencies of Fetcenko et al. Thus, Fetcenko et al. in view of Leland does not render obvious claims 6, 7, 14-15 and 19. Further, Applicants' newly presented claims 27, 28, 34 and 35 are allowable over Fetcenko et al. in view of Leland.

Accordingly, withdrawal of the Examiner's rejection is respectfully requested. Likewise, Applicants' newly presented claims 27, 28, 34 and 35 are allowable over Fetcenko et al. alone, or in view of Leland.

Rejection Under 35 U.S.C. §103(a) – Fetcenko et al. in view of Wootton et al. or Sandrock et al.

In the Office Action, the Examiner rejected claim 13 under 35 U.S.C. §103(a) as being unpatentable over Fetcenko et al. in view of Wootton et al. (U.S. Patent No. 4,576,640) or Sandrock et al. (U.S. Patent No. 4,839,085). Claim 13 indirectly depends from claim 1.

Wootton et al. discloses a hydrogen storage material for releasably storing hydrogen having a defined microstructure. *Abstract*. Sandrock et al. discloses a method of manufacturing high-zirconium getters that involves hydrogen pulverization of an entire alloy ingot or ingot pieces. *Abstract*.

However, neither Wootton et al. nor Sandrock et al. make up for the deficiencies of Fetcenko et al. Thus, Fetcenko et al. in view of Wootton et al. or Sandrock et al. does not render obvious claim 13. Further, Applicants' newly presented claim 33, which indirectly depends from claim 22, is allowable over Fetcenko et al. in view of Wootton et al. or Sandrock et al.

Accordingly, withdrawal of the Examiner's rejection is respectfully requested.

CONCLUSION

For all the reasons advanced above, Applicants respectfully submit that the application is in condition for allowance and that action is earnestly solicited.

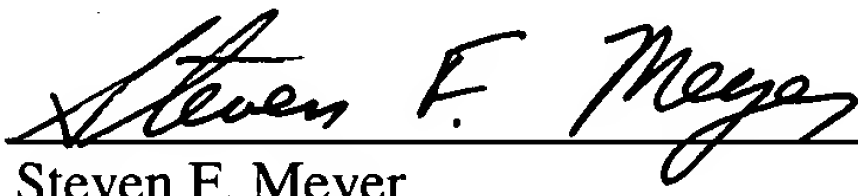
The Commissioner is hereby authorized to charge any additional fees which may be required for this amendment, or credit any overpayment to Deposit Account No. 13-4500, Order

No. 5000-4964.

In the event that an extension of time is required, or may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. 13-4500, Order No. 5000-4964.

Respectfully submitted,
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Dated: June 2, 2003

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AMENDMENTS SHOWING INSERTIONS AND DELETIONS**IN THE CLAIMS**

Please amend claims 1, 4, 9, 19 and 20 to read as follows:

1.(Once Amended) A method comprising:

disposing a substantially solid block of hydrogen-absorbing alloy within an activation vessel,

introducing hydrogen gas into the activation vessel under conditions that will cause the hydrogen-absorbing alloy to absorb hydrogen and crack or break apart, thereby forming a substantially powdered hydrogen-absorbing alloy, [and]

evacuating a hydrogen-storage tank, and

transferring the substantially powdered hydrogen-absorbing alloy from the activation vessel to [a] the hydrogen storage tank without substantially exposing the powered hydrogen-absorbing alloy to oxygen.

4. (Once Amended) A method according to claim 1, wherein [relatively high-pressure and low temperature] the hydrogen gas [is] introduced into the activation vessel has a pressure of about 0.5 – 10 MPa and a temperature of between about 20 – 60°C.

9. (Once Amended) A method according to claim 8, further comprising continuously supplying [an] the inert gas to the hydrogen storage tank when the flat lid is being affixed to the hydrogen storage tank.

19. (Once Amended) A method according to claim 14, further comprising storing hydrogen as absorbed hydrogen within the powdered hydrogen-absorbing alloy disposed within the hydrogen storage tank [of claim 18].

20. (Once Amended) A method of manufacturing a hydrogen storage tank with a powdered hydrogen-absorbing alloy that has absorbed hydrogen, the method comprising:
preparing an activation vessel filled with a hydrogen-absorbing alloy,

activating the hydrogen-absorbing alloy by introducing hydrogen gas into the activation vessel,

generating a substantially powdered hydrogen-absorbing alloy that has been activated within the activation vessel by means of the hydrogen gas,

evacuating a hydrogen-storage tank,

connecting the hydrogen storage tank to the activation vessel and

supplying the activated hydrogen-absorbing alloy to the hydrogen storage tank from the activation vessel.

Please cancel claims 10 and 16-18.

Please add claims 21 – 37 which read as follows:

-- 21. (New) A method of manufacturing a hydrogen storage tank with a powdered hydrogen-absorbing alloy that has absorbed hydrogen, the method comprising:

preparing an activation vessel filled with a hydrogen-absorbing alloy,

activating the hydrogen-absorbing alloy by introducing hydrogen gas into the activation vessel,

generating a substantially powdered hydrogen-absorbing alloy that has been activated within the activation vessel by means of the hydrogen gas,

filling the hydrogen-storage tank with an inert gas,

connecting the hydrogen storage tank to the activation vessel and

supplying the activated hydrogen-absorbing alloy to the hydrogen storage tank from the activation vessel. --

-- 22. (New) A method comprising:

disposing a substantially solid block of hydrogen-absorbing alloy within an activation vessel,

introducing hydrogen gas into the activation vessel under conditions that will cause the hydrogen-absorbing alloy to absorb hydrogen and crack or break apart, thereby forming a substantially powdered hydrogen-absorbing alloy,

filling the hydrogen-storage tank with an inert gas, and

transferring the substantially powdered hydrogen-absorbing alloy from the activation vessel to the hydrogen storage tank without substantially exposing the powdered hydrogen-absorbing alloy to oxygen. --

-- 23. (New) A method according to claim 22, wherein the hydrogen-absorbing alloy is ingot-shaped and the substantially powdered hydrogen-absorbing alloy is produced by continuously breaking the ingot-shaped hydrogen-absorbing alloy within the activation vessel due to volume expansion caused by the hydrogen-absorbing alloy absorbing hydrogen. --

-- 24. (New) A method according to claim 22, further comprising cooling the hydrogen-absorbing alloy within the activation vessel and then introducing high-pressure hydrogen to the cooled hydrogen-absorbing alloy. --

-- 25. (New) A method according to claim 22, wherein relatively high-pressure and low temperature hydrogen gas is introduced into the activation vessel. --

-- 26. (New) A method according to claim 22, wherein the substantially powdered hydrogen-absorbing alloy is transferred from the activation vessel to the hydrogen storage tank by connecting the activation vessel to the hydrogen storage tank via a valve. --

-- 27. (New) A method according to claim 26, wherein the valve comprises a ball valve disposed on the activation vessel. --

-- 28. (New) A method according to claim 27, further comprising transferring the ball valve from the activation vessel to the hydrogen storage tank when the powdered hydrogen-absorbing alloy is transferred to the hydrogen storage tank from the activation vessel. --

-- 29. (New) The method according to claim 22, further comprising affixing a flat lid to the top of the hydrogen storage tank, thereby defining a ceiling portion of the hydrogen storage tank, after the powdered hydrogen-absorbing alloy has been transferred to the hydrogen storage tank. -

-- 30. (New) A method according to claim 29, further comprising continuously supplying the inert gas to the hydrogen storage tank when the flat lid is being affixed to the hydrogen storage tank. --

-- 31. (New) A method according to claim 22, further comprising storing hydrogen as absorbed hydrogen within the powdered hydrogen-absorbing alloy disposed within the hydrogen storage tank. --

-- 32. (New) A method according to claim 22, wherein the hydrogen absorbing alloy comprises titanium and vanadium and has a body centered cubic (BCC) structure. --

-- 33. (New) A method according to claim 32, wherein the hydrogen gas contacts the hydrogen absorbing alloy at a pressure of about 0.5-10 MPa and a temperature of between about 20-60°C. -

-- 34. (New) A method according to claim 33, further comprising:

cooling the hydrogen-absorbing alloy within the activation vessel and then introducing relatively high-pressure and low temperature hydrogen to the cooled hydrogen-absorbing alloy, wherein the hydrogen-absorbing alloy is ingot-shaped and the substantially powdered hydrogen-absorbing alloy is produced by continuously breaking the ingot-shaped hydrogen-absorbing alloy within the activation vessel due to volume expansion caused by the hydrogen-absorbing alloy absorbing hydrogen, and wherein the substantially powdered hydrogen-absorbing alloy is transferred from the activation vessel to the hydrogen storage tank by connecting the activation vessel to the hydrogen storage tank via a ball valve disposed on the activation vessel. --

-- 35. (New) A method according to claim 34, further comprising transferring the ball valve from the activation vessel to the hydrogen storage tank when the powdered hydrogen-absorbing alloy is transferred to the hydrogen storage tank from the activation vessel. --

-- 36. (New) A method comprising:

disposing a substantially solid block of hydrogen-absorbing alloy within an activation vessel,

introducing hydrogen gas into the activation vessel under conditions that will cause the hydrogen-absorbing alloy to absorb hydrogen and crack or break apart, thereby forming a substantially powdered hydrogen-absorbing alloy, and

transferring the substantially powdered hydrogen-absorbing alloy from the activation vessel to a hydrogen storage tank without substantially exposing the powdered hydrogen-absorbing alloy to oxygen and without the absorbed hydrogen being substantially desorbed from the substantially powdered hydrogen absorbing alloy. --

-- 37. (New) A method according to claim 36, wherein the substantially powdered hydrogen-absorbing alloy is transferred from the activation vessel to the hydrogen storage tank by connecting the activation vessel to the hydrogen storage tank via a valve, so that the substantially powdered hydrogen absorbing alloy is prevented from communicating with the environment outside of the activation vessel and the hydrogen storage tank during the transferring from the activation vessel to the hydrogen storage tank. --